accordance with another embodiment of the present invention; and

Figure 5 is a partial enlarged view of the embodiment shown in Figure 4, after assembly.

Detailed Description

Referring to Figure 1, an array display 10 may include a plurality of panels 12 that abut along gaps 14. Each panel 12, such as the panel 12C, may be made up of a plurality of modules 15. Each module 15 generates a portion of the overall image displayed by a panel 12 and each panel 12 creates a portion of the overall image displayed by the array display 10. Thus, the resulting composite image of the display 10 may be made up of the contributions to that image from the panels 12 and modules 15.

In many applications, it may be advantageous to build larger displays from smaller modules and panels. For example, in one embodiment, building unitary larger displays may involve more complex manufacturing processes. In other cases, building unitary larger displays may result in greater losses because, if any portion of the larger display is defective, the whole display may be ruined. Array displays on the order of one thousand pixels are envisioned, with relatively large pixels, on the order of one millimeter or greater.

Referring to Figure 2, in one embodiment, the array display 10 includes an optical integrator plate 16, placed over the emissive side of each panel 12. Each plate 16 may have a black matrix (not shown in Figure 2) formed on the rear side 18 of the plate 16 to obscure seams and gaps between adjacent pixels. In such case, a gap 14 exists between adjacent plates 16 (such as the plates 16a and 16b) and between underlying adjacent panels 12 (such as the panels 12a and 12b). Each module 15 may include front and back sections 18 and 20 respectively.

Referring to Figure 3, a series of black matrix lines 22 may be formed on the underside of each optical integrator plate 16. In some embodiments, the black matrix lines 22 may be formed in transverse rows and columns spaced apart by the width of each pixel. Thus, the black matrix lines 22 frame each pixel and serve to reduce the ability to perceive specific pixels while increasing contrast between pixels in some embodiments.

The spaces between adjacent plates 16, such as plates 16a and 16b, may be filled with a filler material 24. The filler material 24 may be optically transparent and may have substantially the same index of refraction as the optical integrator plates 16 themselves. In some embodiments, that index of refraction is from about 1.3 to 1.5.

09795256.101401

The portion of the gap 14 between the optical integrator plates 16 and the underlying modules 15 may be filled by a black material 26 that may be a resilient material such as silicone or foam. The material 26 may be of a color and size to closely match the black matrix lines 22. Also, the material 26 may be positioned to continue the regular pattern of spacing between block matrix lines 22, in some embodiments. In addition, the shininess or light reflection characteristics of the material 26 may match those of the black matrix lines 22. In general, the material 26 may substantially match the optical characteristics of the lines 22.

The material 26 may take on an appearance very similar to that of the black matrix lines 22. Thus, the combination of the appearances of the portions 24 and 26 with the black matrix lines 22 is to create an overall seamless appearance both between pixels and modules.

In addition, a separator 28 may be provided between adjacent modules 15, such as the modules 15a and 15e. In some embodiments, the separator 28 may be made of a resilient material that cushions any potential impacts or jostling between adjacent modules 15 either during assembly or during transportation. In one embodiment, the separator 28 may be formed of a resilient material such as a polymer such as silicone. If the separator 28 is applied in liquid

10971047.052600